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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,693	12/29/2003	Ilan Sutskover	MP1484	2151

64768 7590 01/22/2009

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EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	PAPER NUMBER
2611	
MAIL DATE	DELIVERY MODE
01/22/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/749,693	SUTSKOVER ET AL.	
	Examiner	Art Unit	
	ADOLF DSOUZA	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 11, 13 - 43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 11, 13 - 43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments, see Remarks, filed 11/10/2008 (page 13, last paragraph) with respect to the 35 USC 112 rejection of claim 27 have been fully considered and are persuasive. The 35 USC 112, 1st paragraph rejection of claim 27 has been withdrawn.

2. Applicant's arguments, see Remarks, filed 11/10/2008 (page 14, last paragraph) with respect to the 35 USC 112 rejection of claim 41 have been fully considered and are persuasive. The 35 USC 112, 2nd paragraph rejection of claim 41 has been withdrawn.

3. Examiner previously objected/allowed claim 12 (CTNF 7/10/2008), which Applicant then incorporated into the independent claims. Examiner is now introducing a new reference Komatsu (US 6,144,860) to address this limitation.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 1 - 3, 6, 7, 10, 11, 14, 22 - 24 , 41, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Foschini et al. (US 20030104808) and further in view of Komatsu (US 6,144,860).

Claims 1, 22, Hwang discloses:

• obtaining first data to be delivered to multiple user devices via a common channel ([0150], lines 1-4, 43-48);

• obtaining second data to be delivered to a specific user device via a dedicated channel ([0150], lines 1-4, 43-48);

• acquiring channel information for a common channel between a transmitter and said specific user device ([0153], lines 16-22);

• and generating a transmit signal for said specific user device using said first data, said second data, said transmit signal to be transmitted from said transmitter to said specific user device via a dedicated channel ([0149], lines 1-6, [0150], lines 43-48, 54-55. Also see Response to Arguments (a) above).

Hwang does not disclose that the transmit signal is generated using the channel information, an interference component and subtracting out the interference component.

In the same field of endeavor, however, Foschini discloses the transmit signal is generated using the channel information ([0027]). Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Hwang because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

In the same field of endeavor, however, Komatsu discloses determining a common channel interference component and a difference between the common channel interference component and the second data (column 2, line 63 - column 3, line 3).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Komatsu, in the system of Hwang because this would enable the interference to be removed at the transmitter, thereby increasing transmitting power.

Claims 2, 23, Hwang further discloses acquiring channel information for a dedicated channel between said transmitter and said specific user device before generating said transmit signal, wherein generating said transmit signal includes using said channel information for said dedicated channel ([0149], [0150]).

Claims 3, 24, Hwang further discloses said transmit signal is configured so that common channel interference will be at least partially cancelled within said specific user device after reception therein ([0153]).

Claim 6, Hwang further discloses acquiring channel information includes receiving channel information from said specific user device ([0153], lines 16-22).

Claim 7, Hwang further discloses said transmitter is part of a base station in a cellular CDMA system (abstract, line 3); and said first data includes data to be broadcast as part of a pilot signal ([0010]).

Claim 10, Hwang further discloses generating a transmit signal includes determining a common channel interference component that would be output by a receiver of said specific user device as a result of transmitting said first data from said transmitter into said common channel without using interference mitigation ([0153], lines 16-22).

Claim 11, Hwang further discloses determining a common channel interference component includes determining an effect of the common channel, as given by said channel information, on said first data ([0153], lines 16-22).

Claim 14, Hwang further discloses transmitting said transmit signal from said transmitter ([0068].

Claim 41 limitations are analyzed similar to those in claim 1, with the common channel information being the midamble sequence that is transmitted on both the common and dedicated channels. The mitigation of channel interference is done as disclosed by Foschini.

Claim 43, is analyzed similar to limitations in claim 1, where the channel information is obtained and used on the transmitter side, as disclosed by Foschini.

6. Claim 27 - 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Foschini et al. (US 20030104808) and furthering view of Rasanen et al. (US 5,956,332) and Komatsu (US 6,144,860).

Claim 27, Hwang discloses:

• obtaining first data to be delivered to user devices associated with a first class via corresponding dedicated channels ([0150], lines 1-4; Fig. 16, user data 1601; wherein the first data is interpreted as the input data to one of the dedicated channels);

• obtaining second data to be delivered to user devices associated with a second class via corresponding dedicated channels([0150], lines 1-4; Fig. 16, user data 1601; wherein the second data is interpreted as the input data to another one of the dedicated channels);

• acquiring channel information from user devices associated with said second class ([0153], lines 16-22);

generating transmit signals to be transmitted to user devices associated with said first class without using dirty paper techniques (Fig. 16; where no pre equalization is used on the dedicated channel that transmits the first data);

• generating transmit signals to be transmitted to user devices associated with said second class using said second data ([0149], lines 1-6, [0150], lines 43-48, 54-55).

Hwang does not disclose combining the first and second data and using dirty paper techniques.

Hwang does not disclose that the transmit signal for the second class is generated using dirty paper techniques.

In the same field of endeavor, however, Foschini discloses the transmit signal is generated using dirty paper cancellation techniques ([0027], [0006]).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Hwang for the channel associated with the second class because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

Rasanen discloses combining first data and second data (Fig. 7B, element 68). Rasanen discloses this on the receiver side but one having ordinary skill in the art, can easily use the data combiner on the transmitter side, to send both the first data and second data to the user devices associated with the second class, rather than only the second data to the user devices associated with the second class.

In the same field of endeavor, however, Komatsu discloses determining a common channel interference component and a difference between the common channel interference component and the second data (column 2, line 63 - column 3, line 3).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Komatsu, in the system of Hwang because this would enable the interference to be removed at the transmitter, thereby increasing transmitting power.

Claim 28, Hwang does not disclose that the user equipment in his invention includes user devices that do not use dirty paper cancellation techniques.

Claims 29, 30, Hwang fails to disclose using dirty paper cancellation techniques, however, Foschini discloses generating a transmit signal includes using dirty paper cancellation techniques ([0006]). Foschini further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into .the invention of Hwang.

Claims 31, 32, Hwang fails to disclose generating transmit signals includes generating signals that are configured to cancel interference caused by signals transmitted to user devices, however, Foschini discloses generating transmit signals includes generating signals that are configured to cancel interference caused by signals transmitted to user devices ([0006]). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Foschini into the invention of Hwang. 11.

7. Claims 15 – 17, 19, 20, and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.S. Pub. No. 2004/0028121) in view of Foschini et al. (US 20030104808) and further in view of Komatsu (US 6,144,860).

Claims 15, 19, Fitton discloses:

• at least one dipole antenna ([0038], line 5)

• a common channel interference unit to determine a common channel interference component associated with a remote user device ([0081], lines 3-6)

• generating a transmit signal to be transmitted to said remote user device via a dedicated channel, said transmit signal generator using said dedicated data to generate said transmit signal ([0013], lines 4-5, [0091], lines 1-3).

• a transmit signal transmitted using said at least one dipole antenna ([0038], line 5).

Fitton does not disclose that the transmit signal is generated using the channel information. In the same field of endeavor, however, Foschini discloses the transmit signal is generated using the common channel interference component ([0027]). Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Fitton because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

In the same field of endeavor, however, Komatsu discloses determining a common channel interference component and a difference between the common channel interference component and the second data (column 2, line 63 - column 3, line 3).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Komatsu, in the system of

Hwang because this would enable the interference to be removed at the transmitter, thereby increasing transmitting power.

Claims 16,.20, said common channel interference unit determines said common channel interference component using known common channel transmit data and corresponding channel information (Fitton [0087], line 2).

Re Claim 35, Fitton discloses:

- an interference unit to collect data to be delivered to user devices within a first class via corresponding dedicated channels and to use the collected data to generate a composite interference signal ([0081], lines 3-6);
- a transmit signal generator to generate transmit signals to be transmitted to user devices associated with said first class without using dirty paper techniques.

Fitton does not disclose using dirty paper techniques.

However, Foschini discloses within a second class via corresponding dedicated channels, said transmit signal generator using said composite interference signal, dedicated data to be delivered to said user devices within said second class, and channel information associated with said user devices within said second class ([0013], lines 4-5, [0091], lines 1-3, [0087], line 2).

Therefore, it would be obvious to one of ordinary skill in the art to use the dirty paper technique disclosed by Foschini in the system of Fitton, so that the combined system could transmit to a first and a second class of devices.

All other limitations of claim 35 are as analyzed in claim 15 above.

Claim 36, Fitton does not disclose that the user equipment in his invention includes user devices that do not use dirty paper cancellation techniques.

Claims 17, 37, 38 Fitton fails to disclose using dirty paper cancellation techniques. However, Foschini discloses generating a transmit signal includes using dirty paper cancellation techniques ([0006]). Foschini further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into the invention of Fitton.

8. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Nishio et al. (U.S. Pub. No. 2006/0166690).

Claim 8, Hwang discloses said transmitter is part of a base station in a cellular CDMA system (abstract, lines 1-3). Hwang fails to disclose data to be broadcast as part of a paging signal, however, Nishio discloses data to be broadcast as part of a paging signal ([0005], lines 6-7). Because Nishio discloses this signaling method has an advantage of

more efficient power control ([0008]), it would have been obvious to one skilled in the art at the time of invention to incorporate the paging as disclosed by Nishio into the invention of Hwang.

9. Claims 9, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claims 1 and 22 above, and further in view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 9, 25 Hwang fails to disclose using dirty paper cancellation techniques, however, Foschini discloses generating a transmit signal includes using dirty paper cancellation techniques ([0006]). Foschino further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into .the invention of Hwang.

10. Claims 13, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Shany et al. (U.S. Pub. No. 2004/0030979) and furthering view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 13, 26 Hwang fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it

would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Hwang.

11. Claims 18, 21, 39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.S. Pub. No. 2004/0028121) in view of Shany et al. (U.S. Pub. No. 2004/0030979) and further in view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 18, 21, 39, 42, Fitton fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Fitton.

12. Claims 4, 5, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claims 1 and 27 above, and further in view of Fitton (U.S. Pub. No. 2004/0028121)

Claims 4, Hwang discloses use within a code division multiple access (CDMA) based system. Hwang fails to disclose said common channel interference will be at least partially cancelled at the chip level, however, Fitton discloses said common channel

interference will be at least partially cancelled at the chip level ([0013], lines 4-5, [0091], lines 1-3, [0087], line 2). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Fitton into the invention of Hwang.

Claim 5, Hwang discloses use within a code division multiple access (CDMA) based system. Hwang fails to disclose said common channel interference will be at least partially cancelled at the symbol level, however, Fitton discloses common channel interference will be at least partially cancelled at the symbol level ([0013], lines 4-5, [0091]i lines 1-3, [0087], line 2). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Fitton into the invention of Hwang.

13. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 200410052236) as applied to claim 27 above, and further in view of Ben-David (U.S. Pub. No. 200410101034).

Claim 33, Hwang fails to disclose the transmit signal generator includes matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix, however, Ben-David discloses matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix ([0034]).

Decomposing a matrix into triangular and unitary components makes the solving and manipulation of matrix equations much easier. Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the decomposition as disclosed by Ben-David into the invention of Hwang

14. Claims 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claim 27 above and further in view of Shany et al. (U.S. Pub. No. 2004/0030979).

Claims 34 Hwang fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Hwang.

15. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.SI Pub. No. 2004/0028121) as applied to claim 35 above, and further in view of Ben-David (U.S. Pub. No. 2004/0101034).

Claim 40, Fitton fails to disclose the transmit signal generator includes matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and

a triangular matrix, however, Ben-David discloses matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix ([0034]). Decomposing a matrix into triangular and unitary components makes the solving and manipulation of matrix equations much easier. Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the decomposition as disclosed by Ben-David into the invention of Fitton.

Contact Information

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADOLF DSOUZA whose telephone number is (571)272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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